

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
)	
Amendment of Parts 1, 21 and 74 to Enable)	MM Docket No. 97-217
Multipoint Distribution Service)	
and Instructional Television Fixed)	File No. RM-9060
Service Licensees To Engage in Fixed)	
Two-Way Transmissions)	

NOTICE OF PROPOSED RULEMAKING

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By the Commission:

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I. INTRODUCTION AND SUMMARY

1. The Commission has before it a petition for rulemaking filed by a group of over one hundred participants in the wireless cable industry, including The Wireless Cable Association International, Inc., wireless cable system operators, Multipoint Distribution Service ("MDS") and several Instructional Television Fixed Service ("ITFS") licensees, equipment manufacturers and consultants, (collectively "Petitioners"),¹ requesting that the Commission amend its rules to enhance the ability of MDS and ITFS licensees to provide two-way communication services. The petition proposes enhancing MDS and ITFS through the use of two-way audio, video and data communications from "response" stations, the use of booster stations with program origination capability in a cellular configuration designed to create spectrum flexibility through frequency reuse, and the use of variable bandwidth ("subchanneling" and "superchanneling") to create additional flexibility. For these purposes, the Petitioners submitted a comprehensive package of proposed rules.² As discussed below, we propose to substantially amend our rules to facilitate two-way transmission services and other service improvements sought by the Petitioners. We solicit comment on the technical, procedural and economic effects of implementing the proposed rule changes.

2. Our goals in instituting this proceeding are to facilitate the most efficient use of the affected spectrum, to enhance the competitiveness of the wireless cable industry, and to provide benefits to the educational community through the use of two-way services, such as high speed Internet service. Although the primary use of MDS and ITFS frequencies has historically

¹ A complete list of the Petitioners can be found in Appendix A. Petitioners filed their Petition for Rulemaking on March 14, 1997 and it was placed on Public Notice March 31, 1997. "Pleading Cycle Established for Comments on Petition for Rulemaking to Amend Parts 21 and 74 of the Commission's Rules to Enhance the Ability of Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions," *Public Notice* RM 9060, DA 97-637 (rel. March 31, 1997.) Numerous parties filed comments on May 14, 1997 and reply comments were filed on May 29, 1997. A complete list of commenters and reply commenters is also found in Appendix A.

² The complete text of all of the proposed rule changes is contained in Appendix C. As discussed in the text, we propose to adopt some of Petitioners' suggestions, modify some, and reject others. We also note here that the proposed rule changes of both MDS and ITFS are complimentary and basically the same. By this proceeding, we seek comment on all the proposed rules set out in Appendix C.

been the provision of video services, our rules permit the use of these frequencies for other services.³ Through this rulemaking, we seek to facilitate these other uses when they would best serve the needs of the public.⁴

II. BACKGROUND

3. Under our Rules, educational institutions may obtain licenses to use spectrum for the operation of facilities for the transmission of educational and instructional material.⁵ The spectrum that may be used for these purposes, which is in the 2500-2686 MHz band,⁶ is shared with that used by MDS operators for the provision of service to subscribers. Spectrum that is licensed to ITFS entities, but is unused by them, may be leased to MDS operators, subject to certain technical limitations and programming requirements. The ITFS/MDS spectrum is primarily used for the provision of either one-way video service to students, in the ITFS context, or wireless cable service to subscribers, in the MDS context. However, as discussed more fully below, some spectrum is utilized for the provision of two-way service by licensees and users. This rulemaking proposes to modify our current Rules in order to expand the opportunities for two-way service in the spectrum by changing certain technical rules, amending some programming rules and creating greater flexibility for spectrum users. This rulemaking also proposes to modify some of our current application procedures for ITFS/MDS to facilitate the flexible use that the proposed technical and programming changes would accomplish.

4. In our order in *Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, Declaratory Ruling and Order*, 11 FCC Rcd 18839 (1996) (petitions for clarification and partial reconsideration pending) ("*Digital Declaratory Ruling*"), we authorized wireless cable operators to employ digital compression technology in order to increase the number of usable channels available to them, and also encouraged the use of digital technology by the educational

³ See *Report and Order on Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section 309 (j) of the Communications Act - Competitive Bidding*, MM Docket No. 94-131 and PP Docket No. 92-253, 10 FCC Rcd 9589, 9619 (1995) ("*MDS Auction Order*"); 47 C.F.R. § 21.903(b).

⁴ Commenter Catholic Television Network ("CTN") has proposed that, rather than proceed with the instant rulemaking, we pursue a negotiated rulemaking procedure and convene a federal advisory committee to evaluate Petitioners' proposals and work out the most efficient method to implement them. CTN claims that this would provide substantial, useful information and facilitate the process initiated by the Petitioners. We believe that the instant rulemaking process will provide us with the information needed to adequately evaluate Petitioners' proposals and we decline to adopt CTN's proposal for a negotiated rulemaking at this time. Should circumstances warrant, we reserve the right to revisit our decision on this issue at a later date.

⁵ 47 C.F.R. § 74.932.

⁶ 47 C.F.R. § 74.902.

community.⁷ In spite of the increased capacity offered by digital compression that the *Digital Declaratory Ruling* was intended to facilitate, growth in the industry has remained limited due to economic and technological constraints.⁸ Indeed, as discussed in our *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, CS Docket No. 96-133, FCC 96-496, Third Annual Report, 12 FCC Rcd 4358 (1997) ("*1996 Competition Report*"), the wireless cable industry as a whole was not projected even to begin operating with a positive cash flow until 1996.⁹

5. MDS operators are now facing challenges posed by the convergence of different information delivery systems. For example, cable operators who previously limited their operations to the one-way provision of video programming are increasingly providing a variety of two-way services, including Internet access.¹⁰ As has been discussed in the press and as we noted in the *1996 Competition Report*, other services, including direct broadcast satellite ("DBS")¹¹, satellite master antenna television services ("SMATV"), and the nascent local multipoint distribution services ("LMDS"),¹² are also moving toward the provision of Internet services. In order to remain competitive, the MDS industry will need to be able to offer comparable competitive services. We believe the rule changes we propose in this proceeding will enable the industry to meet the competitive challenge.

6. In addition to the competitive benefits to the MDS industry, and the resulting benefit to consumers because of a larger number of choices, increased two-way capacity over the frequencies at issue will benefit educational institutions by, for example, increasing Internet access via ITFS frequencies and enhancing the value of their spectrum. Such increased Internet abilities will help to further the goal of providing fast, reliable and affordable Internet access to every student in the country.¹³

7. We believe adoption of the proposed rules will also further the mandate of Section 257 of the Telecommunications Act of 1996, which requires the Commission to identify and

⁷ *Digital Declaratory Ruling*, 11 FCC Rcd at 18840.

⁸ *Wireless Cable Investor*, at 9 (Dec. 31, 1996).

⁹ *1996 Competition Report* at 4388.

¹⁰ See, e.g., "Wireless Cable Futures," *Wireless Cable Investor*, at 8 (Dec. 31, 1996); Tedesco, "Cable Modems Move from Concept to Reality," *Broadcasting and Cable*, at 106 (Dec. 9, 1996).

¹¹ Breznick, "Data from Outer Space," *Cable World*, at 53 (Dec. 9, 1996).

¹² *1996 Competition Report* at 4393 and 4406.

¹³ See "Background on Clinton-Gore Administration's Next-Generation Internet Initiative: Qs and As on Next-Generation Internet Initiative," *Office of the Vice President*, at 4 (rel. Oct 10, 1996); Remarks of Chairman Reed Hundt, Technology and Learning Conference, National School Board Association, Dallas, Texas (October 24, 1996).

eliminate market entry barriers for entrepreneurs and other small businesses to promote diversity of media voices, vigorous economic competition, technological advancement and promotion of the public interest.¹⁴ As discussed more fully below, we believe that the proposed rule changes would simplify our current licensing system and provide greater flexibility in the use of the allotted spectrum to licensees.

III. DISCUSSION

8. We note that our Rules already permit MDS to provide non-video services.¹⁵ Furthermore, as Petitioners point out, we specifically listed the transmission of high speed computer data as a potential use of MDS facilities when we established the service.¹⁶ Since that time, we consistently have recognized that MDS licensees enjoy the flexibility to provide a variety of video and non-video services, subject to compliance with, or the grant of a waiver of, our rules.¹⁷ For example, the Mass Media Bureau has made clear that leased ITFS frequencies (as well as MDS channels) can be used for asymmetrical high speed digital data applications, including Internet access, if that usage complies with our technical rules and the *Digital Declaratory Ruling*.¹⁸ In this proceeding, Petitioners are asking that we implement a series of technical rule changes that would give MDS and ITFS licensees the needed flexibility to fully exploit digital technology in delivering two-way communications services.

9. Even though the Commission has permitted MDS licensees to provide two-way service, Petitioners argue that the existing rules are too cumbersome and impose too great a financial burden. For example, in a recent authorization for two-way operation in the MDS band each subscriber location was individually licensed.¹⁹ Petitioners argue that this type of approach is not commercially viable for most two-way wireless applications and is demonstrative of the impediments to expansion. Instead, Petitioners propose a system under which licensees would be permitted to utilize all or part of a 6 MHz channel for return path transmissions from subscriber premises, to cellularize their transmission systems to take advantage of spectrally

¹⁴ *Telecommunications Act of 1996*, P.L. 104-104, 110 Stat 56 (1996).

¹⁵ See, e.g., 47 C.F.R. 21.903(b); *MDS Auction Order*, 10 FCC Rcd at 9619.

¹⁶ *Amendment of Parts 1, 2, 21, and 43 of the Commission's Rules and Regulations to Provide for Licensing and Regulation of Common Carrier Radio Stations in the Multipoint Distribution Service*, 45 FCC 2d 616, 617 (1974) ("MDS Order").

¹⁷ See, e.g., *Amendment of Parts 21 and 74 of the Commission's Rules With Regard to Filing Procedures in The Multipoint Distribution Service and in the Instructional Television Fixed Service*, 10 FCC Rcd 13821, 13825 (1995).

¹⁸ See "The Mass Media Bureau Implements Policy for Provision of Internet Service on MDS and Leased ITFS Frequencies," *Public Notice*, DA 96-1720 (rel. Oct. 17, 1996).

¹⁹ See Applications of Atlantic Microsystems, Inc., File Nos. BMDP-9701115K1 through BMDP-970115KM (granted Jan. 27, 1997).

efficient frequency reuse techniques, and to employ modulation schemes consistent with bandwidths either larger or smaller than 6 MHz, all while providing incumbent MDS and ITFS licensees interference protection equivalent to what they currently receive.

10. Petitioners have emphasized that they are not seeking a reallocation of spectrum, but instead are seeking to modify the technical rules governing the spectrum already allotted to MDS and ITFS. However, commenters Interactive Video Trade Association ("ISTA") and WebCel Communications, Inc. ("WebCel") both have opposed Petitioners' proposal on the grounds that the contemplated rule changes would fundamentally alter the nature of MDS and ITFS, undermine the auction process, and unfairly harm potential competitors. We disagree with ISTA's and WebCel's arguments. Both of these commenters overlook the fact, discussed above, that the types of two-way service that the rule changes would encourage already have been authorized to MDS licensees.²⁰

A. Revised Definition of MDS

11. Petitioners propose that we create a regulatory system authorizing the use of response stations and response station hubs to enable the two-way operation of wireless cable systems. Response stations would be the means of transmission from a subscriber's premises and could be implemented as separate transmitters or as parts of a transverter (combined transmitter and receiver) and could use either separate transmitting antennas for return paths or combined transmitting/receiving antennas. Response station hubs would serve as the collection points for signals from the response stations in a multipoint-to-point configuration for upstream signal flow.

12. Under our current regulatory scheme, MDS operators typically only provide two-way service to subscribers using telephone return links or individually licensed subscriber premises stations. This is an outgrowth of the basic one-way approach to MDS transmission from which our current rules originated. We propose to expand the definition of the Multipoint Distribution Service in Section 21.2 of our Rules to fully incorporate the concept of two-way transmission. The proposed definition would read:

Multipoint Distribution Service (MDS): A domestic public radio service rendered on microwave frequencies from one or more fixed stations transmitting to multiple receiving facilities located at fixed points and/or from multiple Multipoint Distribution Service response stations transmitting to response station hubs.

²⁰ ISTA also argues that adoption of the proposed rule changes would be akin to fraud, breach of contract, and unconstitutional taking of property. ISTA bases its claims on the assertion that Interactive Video and Data Service ("IVDS") operators obtained at auction a monopoly to provide certain two-way services that other providers, *i.e.* MDS and ITFS licensees, could not. However, two-way service by MDS and ITFS operators was publicly discussed and permitted before the IVDS auction took place in 1994. *See, e.g., MDS Order*, 45 FCC 2d at 617. Furthermore, the Commission has never promised the claimed monopoly and ISTA has not cited to any Commission pronouncements that established the claimed monopoly. Therefore, we reject ISTA's claims on this issue.

This changed definition is representative of the reorientation of the regulatory approach to MDS, from that of an essentially one-way service with two-way service permitted on a limited basis, to a fully flexible service in which licensees can provide either one-way or two-way service in response to the demands of the competitive marketplace. We solicit comment on this new service paradigm.

13. As fully set out in Appendix C, we also propose to amend the definition for a "Multipoint distribution service response station" to indicate that licensees would be permitted to utilize all or part of any 6 MHz MDS or ITFS channel as a response channel consistent with the other technical and service rules proposed herein. The proposed definition would read as follows:

Multipoint Distribution Service response station. A fixed station operated by an MDS licensee, the lessee of MDS channel capacity or a subscriber of either to communicate with a response station hub or associated MDS station. A response station under this part may share facilities with other MDS response stations and/or one or more Instructional Television Fixed Service (ITFS) response stations authorized pursuant to §74.939.

Commenter Caritas Telecommunications, Inc. ("Caritas") has proposed that we limit the availability of response channels to MDS channels 1, 2, and 2A, converting those channels from the current use for point-to-multipoint transmissions to subscribers' homes to use for transmission return paths. We tentatively decline to adopt this counter-proposal and agree with Petitioners that it would both artificially limit the amount of spectrum that could be used for return paths and unnecessarily prevent ITFS licensees from using their own channels for return paths. In regard to Caritas' belief that its proposal would provide protection from harmful interference, we believe that such protection can be achieved in other ways, as discussed more fully below. We solicit comments on our proposals regarding the expanded definition of response stations, including provision for transmissions on all available MDS and ITFS channels, and on Caritas' counter-proposal.

14. A key element of Petitioners' proposal is the use of "response station hubs," facilities that would receive the transmissions of response stations. These hubs are intended to permit MDS response stations to operate at lower power because the response stations hubs will be located closer to subscriber premises than are current transmitter sites. The hubs are expected to improve service reliability and permit greater frequency reuse than if each subscriber were required to communicate directly with their current primary transmitter site. We therefore propose to add the following definition:

Response station hub. A fixed facility licensed for use in accordance with § 21.909 that is operated by an MDS licensee or the lessee of an MDS facility for the reception of information transmitted by one or more MDS response stations. A response station hub licensed under this part may share facilities with other

MDS response station hubs and/or ITFS response station hubs
authorized pursuant to § 74.939.

The Petitioners suggest that channels adjacent to the channels received at response station locations most probably will be used for response station transmissions. Since the adjacent channels used in a wireless cable system are usually assigned to different licensees as a result of the interleaved channel allocation pattern in the 2.5 GHz band, it is likely that most hubs and associated response stations will be facilities shared by multiple licensees. In other words, a response station hub and associated response stations will operate under multiple authorizations, which will be identical in all respects other than in the name of the licensee and the authorized channels of operation. We seek comment on the proposed revised definition and its implications.

15. We also propose to expand the definition for "signal booster stations" such that it will be clear that those stations would be authorized to originate transmissions, as well as to relay transmissions from other stations. As envisioned by Petitioners, booster stations would be used to cellularize wireless cable operations, which now may operate in areas too large to be served by a single station. Permitting boosters to originate as well as relay programming would facilitate frequency reuse cellular configurations and two-way high speed Internet access and other services. The location restriction in the current definition would be removed because it unnecessarily duplicates a restriction already contained in § 21.913 that is retained essentially intact. The proposed definition would read:

Signal booster station. An MDS station licensed for use in accordance with § 21.913 that operates on one or more MDS channels. Signal booster stations are intended to augment service as part of a distributed transmission system where signal booster stations retransmit the signals of one or more MDS stations and/or originate transmissions on MDS channels. A signal booster station licensed under this part may share facilities with other MDS signal booster stations and/or one or more ITFS signal booster stations authorized pursuant to § 74.985.

We seek comment on the definition and the proposal to expand the role of booster stations in this manner.

B. Technical Standards

1. Channelization

16. Petitioners request that we permit flexible subchannelization of MDS and ITFS channels, *i.e.*, the division of a channel of a particular bandwidth into multiple channels of smaller bandwidth. Currently, licensees are assigned standard 6 MHz channels for point-to-multipoint transmission of video signals and associated audio signals; response channels of 125 kHz bandwidth are available for return path use. A paired response channel is available for each

ITFS channel and for E and F MDS channel groups. In the *Digital Declaratory Ruling*, we permitted the use of digital emissions in order to allow licensees to take advantage of the fact that such emissions could facilitate the transmission of multiple video and audio signals within the 6 MHz bandwidth. However, licensees were not permitted by the *Digital Declaratory Ruling* to alter in any way the overall bandwidth limitations applicable to the channels in use (for example, power level in interference analysis), despite the fact that a single channel of video and associated audio, transmitted by either of these digital emissions, would occupy no more than a fraction of a full 6 MHz channel.

17. Petitioners point out that subchannelization would permit them to use their authorized spectrum more effectively, in that it allows more efficient channel reuse within a given service area, and can be used to control the number of response stations operating within a channel and optimize transmitter data rates commensurate with the particular communications service being provided. Petitioners suggest that code division multiple access ("CDMA") emissions could facilitate the use of 4 or 5 channels of 1.25 to 1.5 MHz bandwidth each within a single 6 MHz channel for relatively low data rates, while Quadrature Phase Shift Keying ("QPSK") and Quadrature Amplitude Modulation ("QAM") could accommodate higher data rates using multiple channels within a 6 MHz channel. With respect to 125 kHz channels now available for response use, Petitioners believe that subdivision of these channels should also be permitted, although such new subchannels would be limited to relatively low data rates because of their very narrow bandwidth. To make possible the use of spectral density analysis, for example, in interference analysis involving subchannels, Petitioners ask that proposed subchannels and superchannels be limited to digital transmissions with uniform spectral power density across the 6 MHz channel width.²¹ We seek comment on these proposals.

18. Petitioners also request that we permit superchannelization of MDS and ITFS channels, *i.e.*, the combining of more than one channel into a single, wider channel. For example, four 6 MHz channels could be aggregated to form one channel with a 24 MHz bandwidth or four 125 kHz channels could be combined to create a single 500 kHz channel. These wide channels, Petitioners argue, could be used for the transmission of high data rates and/or the use of spread spectrum emissions. Petitioners contemplate that transmitting stations using such wideband emissions would be licensed to multiple entities in some instances, as the current channelization arrangement in both services provides generally for the assignment of interleaved, non-contiguous channels. We seek comments on Petitioners' proposals.

2. Spectral Mask

19. In the *Digital Declaratory Ruling*, we waived our rules with respect to out-of-band emissions and permitted the use of a somewhat relaxed spectral mask for digital transmission

²¹ Uniform energy dispersion is a requirement for interim digital operations pursuant to the *Digital Declaratory Ruling*.

modes.²² On an interim basis, the Commission waived its analog emission mask to provide for 38 dB attenuation at the channel edges, with uniformly sloping attenuation to 60 dB at 3 MHz from the channel edges and beyond. This action was taken because the Commission concluded that the application of the current analog emission mask to digital emissions would be unnecessarily restrictive and could increase the cost of digital equipment while providing no benefit. In addition, the results of laboratory tests submitted in connection with the Commission's consideration of this issue demonstrated that a digital station using the relaxed mask is less likely to cause interference than an analog station using the existing, more restrictive, mask.

20. Petitioners propose changes to sections 21.908 and 74.936 of the Commission's Rules to permanently incorporate the out-of-band emission waiver of the *Digital Declaratory Ruling*, although with certain modifications; specifically, changes are proposed for primary system transmitters and single channel booster transmitters with a power greater than -9 dBW EIRP. Likewise, for sub- and superchannels, the attenuation of out-of-band emissions would begin at the edges of the particular bandwidth in use, e.g., for a 24 MHz superchannel, 38 dB of attenuation would be required at the upper and lower edges of the combined channels, with uniformly sloping attenuation to 60 dB at 3 MHz from the edges of the combined channels and beyond the 24 MHz channel. For subchannels, 38 dB of attenuation would be required at the subchannel edges.²³ Where digital modulation is employed, the amount of attenuation would be related to the licensed average power level or, for subchannels, the appropriately adjusted value based on the ratio of the channel to subchannel bandwidths. We seek comment on these proposals.

21. For booster stations with an EIRP of -9 dBW or less, Petitioners request that no spectral mask whatever be applicable to the out-of-band emissions of these stations. Petitioners argue that such low power stations have only a very limited potential for interference, and that applying strict emission limitations to them would significantly increase the price of equipment with no benefit to the user or nearby licensees in terms of added interference protection. We request comment on whether eliminating a spectral mask for low power boosters presents an undue interference risk, and, if so, which additional interference safeguards should be adopted.

²² Out-of-band analog emission limitations for MDS and ITFS stations are set out at § 21.908(b) and § 74.936(b) of the Commission's Rules, and require that such emissions be suppressed at least 38 dB relative to the peak visual carrier at the channel edges and have a uniformly sloping attenuation from this level to 60 dB at 1 MHz below the lower band edge of the 6 MHz channel and 0.5 MHz above the upper band edge of the 6 MHz channel. All out-of-band emissions above or below these limits must be attenuated a minimum of 60 dB below the peak visual carrier.

²³ The effect of this requirement would be to permit equipment operating in subchannels away from the edges of a 6 MHz channel to have very low suppression of emissions which fall outside of the subchannel, so long as the suppression was great enough to meet the overall limits at the edges of the 6 MHz channel and beyond. Only equipment operating on subchannels near either edge of the 6 MHz channel would need significant suppression of out-of-band emissions (and then only in one direction) in order to meet the overall 6 MHz suppression requirements.

22. For a booster station transmitting on multiple non-contiguous channels carrying separate signals ("broadband booster"), with an EIRP greater than -9 dBW and employing either digital or analog modulation, Petitioners request that a somewhat less stringent spectral mask be applied as compared to that applied to other high power stations (*i.e.*, EIRP > -9 dBW), based on laboratory tests done in connection with the *Digital Declaratory Ruling* showing that satisfactory performance and interference protection could be achieved with the relaxed levels. (See proposed Section 21.908(b), Appendix C.) For a response station using digital emissions in all or part of a 6 MHz channel, Petitioners propose a spectral mask requiring attenuation of the emission by 38 dB at the upper and lower edges of the 6 MHz channel (irrespective of actual bandwidth used), with linearly sloping attenuation to 60 dB at points 3 MHz above and below the 6 MHz channel and beyond. In addition, Petitioners suggest that it may be necessary to employ guardbands to meet the proposed spectral mask, which they indicate might be helpful in providing a basis for type acceptance of response station transmitters. For a response station using digital emissions contiguously over more than one 6 MHz channel, Petitioners propose a spectral mask requiring 38 dB attenuation of the emission at the upper and lower edges of the superchannel, with linearly sloping attenuation to 60 dB at points 3 MHz above and below the superchannel and beyond. As an exception to the spectral masks for response stations utilizing one or more of the 125 kHz response channels, Petitioners would permit discrete spurious emissions above the upper and below the lower authorized channel edges provided that: (1) each spur was attenuated below the average power of the emission by at least 40 dB; (2) no more than a single spur occurred each 10 MHz within 50 MHz of the channel upper and lower edges; and (3) no spurs occurred beyond 50 MHz of the upper and lower channel edges. We solicit comment on Petitioners' proposals.

23. For all spectral mask calculations involving digital emissions, Petitioners request that the average power of the emission across its bandwidth be used, as was done in the *Digital Declaratory Ruling* waiver, where we stated that digital emissions will be authorized with an average power level (EIRP) equal to the peak visual power (EIRP) of analog transmissions. At the same time, we also required that steps be taken when using digital emissions to ensure substantially uniform power density across the bandwidth in use, including at times when no data input signal is present to modulate the transmitter. For digital emissions on sub- and superchannels, Petitioners would require that transmitted power be distributed uniformly in such a way that the power per unit of bandwidth is always constant.²⁴ For example, if a maximum 100 watts EIRP were available for a 6 MHz digital emission, then in a subchannel with bandwidth 3 MHz a maximum of 50 watts EIRP would be permissible and in a superchannel of 24 MHz a maximum of 400 watts EIRP would be permissible. We seek comment on whether the degree of attenuation proposed for these various schemes is sufficient to provide adequate adjacent channel interference protection, and we welcome any test results or data which shed

²⁴ A radiated field magnitude with uniform power flux density would be expressed in terms of watts per unit area per unit bandwidth, *e.g.*, dBW/m²/Hz.

further light on spectral masks. We also seek comment on the means for measuring compliance with the spectral mask requirements, including the appropriate resolution bandwidth(s).²⁵

3. Frequency Tolerance

24. With respect to frequency tolerance, Petitioners request that, for all primary station transmitters and all booster stations with power exceeding -9 dBW EIRP, the existing +/- 1 kHz standard be continued because such stations often have large coverage areas and thus significant opportunities to cause interference to neighboring systems. For booster stations with -9 dBW or less EIRP, and for all response stations, Petitioners argue that no frequency tolerance requirement should be imposed due to the limited coverage areas and limited interference range of these stations. Such stations would simply be required to maintain their emissions within the spectral mask specified for them. In the *Digital Declaratory Ruling*, we noted that carrier frequency tolerance is not relevant to digital modulation systems, and we did not impose a frequency tolerance requirement for use of Vestigial Sideband ("VSB") and QAM systems, including the pilot carrier frequency in VSB systems. We therein encouraged additional testing of the pilot carrier offset looking toward adoption of permanent rules for digital systems. We seek comments on whether we should continue not to impose a frequency tolerance requirement for digital transmissions.

25. Petitioners propose to eliminate current Sections 21.908(a) and (c)-(e) and Section 74.950(a)-(e), which set requirements for transmitter installation and performance. Petitioners maintain that these rules apply to analog transmissions but do not apply to digital transmissions and should be eliminated. In the *Digital Declaratory Ruling*, we waived Sections 21.908(a) and 74.950(a) with respect to digital transmissions. We tentatively agree with Petitioners that these rules are incompatible with digital transmissions. Parties are welcome to comment on whether the targeted rules should be retained and modified to apply to stations which only utilize analog video and audio transmissions, or whether they should be deleted altogether.

4. Type Acceptance

26. Included in Petitioners' proposed regulatory scheme are provisions for type acceptance of transmitters. The rules put forth by Petitioners specifically provide for type acceptance of response station transmitters,²⁶ while boosters fall under general MDS and ITFS type acceptance rules.²⁷ We tentatively agree that type acceptance of response station transmitters

²⁵ In the *Digital Declaratory Ruling*, we specified a resolution bandwidth of 100 kHz. 11 FCC Rcd at 18854.

²⁶ See proposed §§ 21.909(l) and 74.939(l).

²⁷ See, e.g., 47 C.F.R. §§ 21.120 and 74.938.

and boosters, including broadband boosters, is appropriate, and we propose to adopt or retain the relevant rules.²⁸ We invite comment on this approach.

5. RF Emissions

27. In their comments, Petitioners further suggest that the Commission adopt rules, similar to those adopted recently for LMDS licensees,²⁹ to govern radio frequency ("RF") emissions for MDS/ITFS return path transmissions. In the *LMDS Second Report and Order*, we stated that it is incumbent upon LMDS licensees to act in good faith and to exercise reasonable care to protect users and the public from the operation of subscriber transceiver antennas. As a further safeguard, we explained that "we believe that requiring licensees to provide user and installation information, and to label subscriber antennas properly, provides adequate notice regarding the potential safety hazards of LMDS subscriber transceivers. We will therefore require LMDS licensees to attach labels to every antenna, in a conspicuous fashion." *Id.* at ¶ 295. We added that we will not mandate the specific language to be used on the labels, however we will require use of the ANSI-specified warning symbol for RF exposure. *Id.* And while we declined to require interlock features, we "strongly encourage[d]" their use to enhance the safety of subscriber transceivers where such features could be made available at reasonable cost. *Id.* at ¶ 296. In modeling the LMDS RF radiation guidelines and procedures after those applicable to MDS systems, we also acknowledged "the technical similarities between LMDS and MDS." *Id.* at ¶ 292. We propose to adopt Petitioners' suggestion and amend the provisions of Section 1.1307 of our Rules that relate to MDS and ITFS, in the manner set forth for LMDS licensees both in the *LMDS Second Report and Order* and as recently modified in our order refining the guidelines for evaluating the environmental effects of RF radiation.³⁰ We seek comment on this proposal.

²⁸ We recently have proposed to streamline the equipment authorization program, and combine the type acceptance and certification programs into a common procedure referred to as "certification." *Amendment of Parts 2, 15, 18 and Other Parts of the Commission's Rules to Simplify and Streamline the Equipment Authorization Process for Radio Frequency Equipment, Notice of Proposed Rulemaking* in ET Docket No. 97-94, FCC 97-84 (released March 27, 1997). Thus, equipment approval requirements for boosters and response station transmitters would follow any revised procedures that we adopt in that proceeding.

²⁹ See *Rulemaking To Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, To Reallocate the 29.5-30.0 GHz Frequency Band, To Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking* in CC Docket No. 92-297 and PP-22, FCC 97-82 (released March 13, 1997) (hereinafter *LMDS Second Report and Order*).

³⁰ *Second Memorandum Opinion and Order and Notice of Proposed Rulemaking* in WT Docket No. 97-192, ET Docket No. 93-62, and RM-8577, FCC 97-303 (released August 25, 1997).

6. Modulation Methods

28. In the *Digital Declaratory Ruling*, we authorized the use of QAM and VSB modulation. While we declined to consider the use of other digital modulation methods in the context of that proceeding,³¹ we stated that we would consider future requests for declaratory rulings where the requesters submit appropriate data to demonstrate that other modulation techniques could be used in a manner that would not interfere with MDS and ITFS analog and digital operations.³² Petitioners intend that the rules that they propose in the Petition accommodate future Commission authorization of digital modulation techniques other than QAM and VSB, but they assert that this proceeding is not the appropriate forum to deal with the details of other modulation techniques. Specifically, Petitioners propose to retain that portion of current Section 21.905(b) of the Commission's Rules which provides that "different types of emissions may be authorized if the applicant describes fully the modulation and bandwidth desired."³³ Petitioners further propose to replicate that provision in Section 74.936(a), and to apply the principle to the 125 kHz channels.³⁴ Thus, given an adequate showing, Petitioners propose that any emission should be permissible for any channel of any bandwidth at any class of MDS or ITFS station, utilizing any permissible power, so long as the emission meets the applicable out-of-band emission requirements and is capable of causing no greater interference than 8-VSB or 64-QAM.

29. Pace Telecommunications Consortium ("Pace") comments that the Commission should immediately grant ITFS and MDS licensees the flexibility to use whatever digital techniques best serve their needs, with interference controlled through the use of power spectral density limits and spectral masks. Pace particularly seeks the use of frequency-shift keying (FSK) modulation and states that use of this modulation would present great cost savings to ITFS licensees. Gulf Coast MDS Service Company comments that the Commission should not impose technology standards for two-way transmissions, because doing so would undermine the development of perhaps more efficient innovations.

30. As an initial matter, as in the *Digital Declaratory Ruling*, "[w]e are not now proposing to adopt one or more 'standard' digital technologies."³⁵ As requested by Petitioners, we will retain or add provisions for accommodating the use of different modulation types. Because we wish to encourage parties to continue to identify different digital modulation schemes that could be useful in MDS and ITFS, we emphasize that we remain open to considering future

³¹ See *Digital Declaratory Ruling*, 11 FCC Rcd at 18847, 18865.

³² *Id.* at 18848.

³³ 47 C.F.R. § 21.905(b).

³⁴ See proposed Sections 21.909(j) and 74.939(j).

³⁵ *Digital Declaratory Ruling*, 11 FCC Rcd at 18848-49.

requests for declaratory rulings in accordance with the *Digital Declaratory Ruling*, upon submission of appropriate data.³⁶ We invite comment on whether there is a basis for concluding that use of particular digital modulation types by MDS and ITFS stations other than VSB and QAM would not be prone to interference, based on the current 45 dB/0 dB protection ratios for cochannel and adjacent channel interference respectively, *i.e.* that such modulation formats should be permitted without requiring test data.³⁷ For example, one modulation type may be a subset of VSB and QAM and, therefore, is covered under the industry tests used to support the *Digital Declaratory Ruling*.

31. In considering Petitioners' proposals for amendment of the existing MDS and ITFS rules pertaining to channelization, spectral mask, frequency tolerance and emissions, the benefits of such changes appear to outweigh the negative effects they might engender. The technical regulations now in place for these services to a large extent reflect the engineering state-of-the-art at the time they were adopted, and were never intended to freeze in place an outdated technology or regulatory scheme to the detriment of better spectrum efficiency at some time in the future. As we noted in the *Digital Declaratory Ruling*, "We expect that the introduction of digital technology will enhance the service of wireless cable operators by allowing opportunities for increased channel capacity and programming choices available to consumers, sharper television pictures, a broader coverage area, and the provision of video, voice and data services that cannot be offered currently." 11 FCC Rcd at 18842 (footnote omitted). As an outgrowth of that action, these proposals are a logical second step to expand the Commission's technical framework for these services beyond the current, narrowly drawn, bandwidth and emission restraints into a more flexible and dynamic framework which can accommodate a vastly greater range of uses. We therefore are proposing to amend our rules as requested by Petitioners in the areas discussed above, expanding the technical flexibility of this service as we have for other services numerous times in the past when we determined that it could be accomplished with no detrimental effect on the overall interference environment for existing licensees and future applicants. We solicit comments on, and reasonable alternatives to, all of these proposals.

C. Interference

32. The Commission's current regulations in ITFS and MDS for interference protection were designed to minimize the potential for destructive cochannel and adjacent channel interference between systems located in proximity to each other. The specific criteria for protection are of two forms, namely, (1) cochannel and adjacent channel desired-to-undesired signal (D/U) ratios and (2) limits on the magnitude of a station's free space field as measured at the edge of the station's protected service area. For cochannel interference protection, an applicant must configure its system so that the signals from each of its transmitters are at least

³⁶ See *Digital Declaratory Ruling*, 11 FCC Rcd at 18848 n.31.

³⁷ We find that we do not currently have adequate information to evaluate Pace's proposal to use FSK modulation in this proceeding.

45 dB weaker than the signals of the existing licensee's transmitters within the licensee's protected service area and/or, in the case of ITFS licensees, at the licensee's protected receiver sites. For adjacent channel protection, the ratio must be at least 0 dB. In order to meet the second form of protection, an applicant generally must be able to demonstrate that the magnitude of the free space radiated field from each transmitter does not exceed a particular limit (*i.e.*, a power flux density -73 dBW/m^2) at the boundary of the applicant's service area.

33. For purposes of providing interference protection for the system configuration presented in the Petition, Petitioners propose to keep the existing interference criteria in essentially unchanged form, and to supplement them with similar new criteria to be applied to hub, booster and response stations. The 45 dB cochannel and 0 dB adjacent channel protection ratios would be applied at all hub station receivers within a primary station's protected service area, and would continue to apply within the 35-mile protected service areas. (These would not be applicable for Basic Trading Area ("BTA") protection, for which interference is prevented in part through the use of the power flux density limit at the BTA boundaries.) For booster station transmitters, the existing radiated field limitation (in terms of power flux density) would be applied to the combined radiation of all boosters within a system, rather than to individual boosters, and this combined radiation level would be added to the radiated field of the primary station transmitter to calculate the overall radiated field of the system at its boundaries to determine compliance with the field limitation or interference protection ratio.³⁸ This change is necessary, Petitioners argue, because their proposed "cellularization" of the MDS/ITFS service areas will necessitate the use of large numbers of booster transmitters, each covering a portion of the service area and operating on a cochannel basis with other boosters and/or the primary station within the service area.³⁹ This system configuration could result in numerous cochannel radiated fields which have the potential for interfering with other nearby systems. We seek comment on Petitioners' arguments.

34. For determining the interference potential of the multitude of response stations associated with Petitioners' proposed cellularized system, Petitioners propose a 3-step process using statistical analysis and worst-case assumptions, necessitated by the fact that individual response station locations and interference potential will not be available for making precise

³⁸ For this calculation, as well as all others proposed by Petitioners, the maximum level of field permitted would be adjusted to account for the actual bandwidth in use, *e.g.*, -73 dBW/m^2 for 6 MHz channels and -89.8 dBW/m^2 for 125 kHz channels or subchannels. A similar adjustment is necessary in the calculation of the field strengths in connection with the 45 dB and 0 dB cochannel and adjacent protection ratios. All of these adjustments are needed in order to properly account for the spectral flux density of the particular signals being considered.

³⁹ Cellularization, in this context, is similar to the well known cellular telephone system, in that large numbers of low power transmitters and localized receivers permit efficient spectrum reuse. Booster stations could serve relatively small geographical areas and could use directional, rather than omnidirectional, antennas to achieve sectoring, *i.e.*, the simultaneous transmission of the same channel in several different directions with different information in each direction.

calculations.⁴⁰ This process is described in a document submitted by Petitioners entitled "Proposed Text of Attachment to Report And Order Setting Forth Method for Predicting Accumulated Signal Power From a Multiplicity of Statistically-Located Transmitters," attached as Appendix D to this notice. In step one, the hub station response service area ("RSA") is defined and a square grid of points is located within this area. The grid of points established within the RSA would consist of the intersections of a group of equidistant parallel straight lines oriented in the north/south and east/west directions and of sufficient length that the grid encompasses the entire RSA. An RSA could take any geographical shape, with its boundaries defined by geographical coordinates and a radius from the response station hub, or by other means. The RSA could be subdivided into smaller geographical regions to allow for response stations of different characteristics within regions of differing population densities. The boundaries of each region would be specified in a manner akin to that used to define the RSA. The territory within a region would be contiguous and no two regions within a RSA would be permitted to overlap. In order to estimate the likely numbers and locations of response stations within an RSA, each of the regions within the RSA would be evaluated to determine the uniformity of its population density. The test for density uniformity would consist of (1) determining the population, using U.S. Census data, of each ZIP Code within a region, (2) dividing each ZIP Code population density by the total population density of the region, and (3) identifying if the resulting quotient is 3 or less in all instances. If so, then population uniformity would be considered adequate within the region. If the quotient is more than 3 for any ZIP Code, then the region would be reconfigured, *i.e.*, the boundaries changed, until adequate uniformity was present. Population uniformity is an important facet of each region because Petitioners assume, *a priori*, that the distribution of response station transmitters will be closely matched to population distribution within each region.

35. In step two, Petitioners propose to identify the technical characteristics of response stations which will be associated with each point in the RSA grid. One or more classes of response stations would be identified within the RSA, with each class being a function of several variables, such as transmitted power (EIRP), antenna height, frequency, bandwidth, or other factors pertinent to the interference potential of the response station class. Within each region of an RSA, at least one class of response station must be specified for use in making interference calculations. In some regions, more than one class of station would be specified, with each class relating to a particular set of response stations with distinguishably similar characteristics. For example, if a particular region encompassed a valley and a large hill, one class of response stations might have relatively low antennas and a second class of response stations might have relatively high antennas. Further, the valley stations might require higher transmitter power to reliably reach the response station hub, thus resulting in two clearly distinguishable differences between the two classes of stations. Petitioners argue that classifications are essential for accurately calculating the interference potential of the response stations within an RSA, in that clearly differentiable classes will almost certainly have clearly differentiable potentials for

⁴⁰ See, Appendix D.

interference to neighboring systems, and these differing interference potentials must be evaluated individually, as well as collectively, to arrive at an accurate overall interference assessment.

36. The final step in calculating response station interference would require combining the radiated fields of all response stations of all classes, of all regions, and of all RSAs within the primary station's protected service area. In order to simplify this calculation, the statistical population uniformity within each region would be used as a basis for grouping proportionate numbers of the total number of response stations of each class at the grid points laid out within each RSA. To accomplish this, each grid point would be made to represent all of the response stations of particular classes in proximity to it, *i.e.*, in the final analysis, all of the response station transmitters of all classes and their associated antennas would be presumed (for calculation purposes) to be sited at the grid point coordinates to which they are nearest. For each class of response station assigned to a grid point (multiple classes could share the same grid points), a set of worst-case assumptions would be made concerning the transmitting antenna radiation pattern, transmitter power (EIRP) and antenna height.⁴¹ The combined radiated field for all of the transmitters for each class of response station at each grid point would then be calculated by assuming that all response stations in each class associated with each grid point are characterized by the worst-case technical parameters assigned for each class. For that purpose, the aggregated power (EIRP) is calculated by dividing the number of simultaneous response station emitters in each regional class by the number of grid points in that region. As a check to determine if an adequate number of grid points has been created for performing interference analyses, Petitioners propose to establish a "measurement line" around each RSA, following the shape of the RSA boundary and 0.5 miles outside of it. Measurement points would be placed at intervals no greater than 0.5 miles along the measurement line.⁴² Petitioners would then divide all of the RSA grid points into two groups, checkerboard fashion, and calculate the power flux density from each the grid points of both groups at each point on the measurement line.⁴³ Then, at each measurement point, the separate power flux densities from all of the grid points in group one would be added together to indicate the total power flux at each measurement point from the group as a whole. A similar calculation would then be performed to aggregate the power flux density at each measurement point produced by all of the grid points in the second group. If the combined

⁴¹ All response station transmitter antennas are assumed to be oriented towards the associated response hub station. The worst-case antenna pattern would be derived by combining the azimuthal (both plane and cross-polarized) radiation patterns of all antennas in use at response stations within a class in such a way that the resulting pattern represents, in all azimuthal directions, the lowest suppression of side lobes present in any of the antennas being combined. Thus, the boresight main lobe of the worst-case pattern may originate with one antenna, while the sidelobes of the worst-case pattern may result from one or more other antennas. In this way, the worst-case pattern will always be more conservative than what would result from the use of any single pattern.

⁴² For a circular RSA of radius 5 miles (circumference = 31.4 miles) a minimum of 69 points would be required. Alternatively, Petitioners suggest that measurements be taken every 5 degrees around the measurement line, as measured from the response station hub location, if that would yield a larger number of points.

⁴³ For this calculation, a single station at each grid point would be assumed having the combined worst-case antenna pattern, the highest EIRP and the highest antenna of any class of station at that grid point.

power flux density from all of the grid points in the first group is within 3 dB of the combined power flux density from all of the grid points in the second group at all measurement points, Petitioners argue that a sufficient number of grid points have been selected for the RSA. If the difference is greater than 3 dB at any measurement point, Petitioners would redraw the RSA grid so as to create additional grid points and continue making comparison calculations between the two groups of grid points until the difference was within 3 dB at all measurement points.

37. Once an adequate grid had been created and tested as described above, Petitioners would then use the equivalent stations at the grid points from all RSAs to calculate compliance with the -73 dBW/m² (or bandwidth prorated) field intensity limit and similar compliance with the 45 dB and 0 dB cochannel and adjacent protection requirements. Thus, where under current rules these values are calculated on a per-transmitter basis, Petitioners' proposed system would necessitate that they be calculated on an aggregated basis, covering hundreds or thousands of transmitters and their combined interference potential to neighboring systems.⁴⁴ According to the methodology, because there is no *a priori* knowledge of the specific locations of response station transmitters, certain assumptions must be made about their distribution within defined geographical areas chosen for their homogeneity. Petitioners propose that an application for a response hub station specify all parameters involved in the analysis; *e.g.*, for each regional class, the maximum station height above ground, maximum EIRP, antenna sectorization (including polarization values), combined worst-case antenna radiation pattern, and the maximum number of assumed simultaneously operated response stations in the regional class. See proposed rule Section 21.909(c), Appendix C. Further, the maximum number of simultaneously transmitting response stations within each class within a region must not exceed the numerical limit proposed for a particular class in the associated response hub application without notification to the Commission. However, if a calculation of field intensities and D/U ratios indicated compliance with maximum permissible values, Petitioners argue that licensees should be free, upon notification to the Commission, to continue adding response station transmitters within their system until such time as calculations indicate that the permissible values (power flux density or D/U ratios) would be exceeded. Petitioners contend, by using worst-case parameters for every class of response station, they have built in a significant degree of extra interference protection which would serve as a buffer for situations where a different mix of stations than anticipated are activated in an RSA.

⁴⁴ It should be noted that, due to the sub- and superchannelization proposals by Petitioners, the aggregation of power from response stations, as well as booster and primary stations, must take into account the bandwidths of the individual stations being aggregated. For example, if one booster station utilized a 24 MHz bandwidth and a second booster used 6 MHz of that 24 MHz, then the aggregated power would be one value over an 18 MHz bandwidth and a higher value over the re-used 6 MHz bandwidth. In an environment with hundreds, or thousands, of stations transmitting and receiving with a complex mixture of sub- and superchannels and high frequency reuse, the number of combinations of frequency overlap will be enormous. This situation also reinforces the need for uniform spectral power flux density within digital signals so that a simple additive process can be used for combining radiated fields, as Petitioners suggest, wherein the flux in dBW is converted to Watts for each field, then fields are then added together, and the result then reconverted to dBW.

38. The sort of system configuration contemplated by Petitioners must involve interference considerations not present in current systems, most especially the anticipated use of large numbers of booster stations to facilitate cellularization of wide-area systems, and the anticipated use of very large numbers of response stations. Inasmuch as the specific locations of primary station transmitters and booster station transmitters will continue to be known, the calculation of interference from these stations, although certainly more complicated than is now the case, nevertheless will be a relatively straightforward process of summation of radiated field intensities at various distances from the transmitters and calculation of D/U interference protection ratios. For response stations, the process is obviously much more complex and less certain, notwithstanding Petitioners' proposals for using Census Data within ZIP Codes for estimating transmitter locations. Such an estimate tacitly assumes a one-to-one correspondence between population density and response station density within a region which has met Petitioners' "3 or less" ratio. In addition, there is no clear way to know the degree of use to which individual response stations will be put, even though Petitioners propose to assume that all of the maximum allowable number of stations are assumed to be transmitting all of the time. The net result is that an assumption about population density would be used as the basis for an assumption about response station transmitter density and location, and these assumptions would then be combined with assumptions about response station EIRP, antenna radiation pattern and antenna height in order to form a statistical picture of response station interference potential which, according to Petitioners, gives a conservative, albeit uncertain, approximation of the operating environment.

39. Petitioners conducted a test in Tucson, Arizona of their proposal involving power accumulation at measurement points and adequacy of grid points. A small system (radius 5 miles; 93 response stations; 72 measurement points on the RSA boundary line) was put in place and measurements made which were compared to theoretical calculations. In general, actual measured signal levels were, as expected, lower than calculated levels and the comparisons of grid square halves generally yielded values which were within 3 dB of each other. Although this test was certainly useful, its results may not be generally applicable to the very diverse geographical and interference environments in which MDS and ITFS systems operate. In particular, the transmitters in the test each utilized a separate, narrowband, channel for transmission to the hub station receiver. In real systems, many transmitters might be sharing the same spectrum simultaneously, creating an environment rich in the potential for cochannel and adjacent channel interference (albeit, perhaps interference internal to the system), complicated by the presence of emissions with very narrow to very wide bandwidths. Additionally, the terrain in the Tucson test area is nearly ideal for tests of a microwave line-of-sight system, because it is almost uniformly flat and free of tall obstacles which could possibly present reflection and diffraction problems that significantly complicate the process of aggregating radiated fields and calculating interference levels. The Tucson area is also relatively devoid of foliage, which further could skew the differences between predicted and measured values.

40. In considering Petitioners' proposals, we have raised concerns, as noted above, that some facets are so complex that they may prove to be very difficult to implement and enforce. In particular, we are concerned that, with the licensing system proposed by Petitioners, numerous filings will result over time as response and booster stations are added and calculations must be

redone repeatedly, to account for the additional interference potential and to account for response station locations which did not fit within the original statistical analysis and RSA grid system. This could present a considerable burden for existing licensees and system operators faced with the need to analyze these filings to verify that no harmful interference will result to their systems. Notwithstanding our reservations, however, we believe that Petitioners' overall goal of facilitating cellularization of the services is very forward-looking, and we believe that it warrants an opportunity to proceed despite the complications and uncertainties which could arise. We therefore are considering adopting Petitioners' modifications to our interference standards for MDS and ITFS as they have been proposed, with only slight further modification.

41. Petitioners propose that, within a given system, the aggregated power from a primary station and all associated booster stations be used for one set of interference calculations, and that a separate set of interference calculations be performed using the aggregated power from response stations, which might operate on adjacent channels. Each of these calculations would then separately be compared to the relevant allowable maximum field values and the permissible D/U ratios. Such a methodology could only be indicative of reality, however, if the response stations were not using all or part of the same spectrum as the primary and booster stations. In instances where all three types of stations share, partially or completely, common spectrum, then the calculations for compliance with the interference standards must come from an aggregation of the power of all three types of stations, and we also are proposing that this be done where the response stations would operate on adjacent channels.

42. We also are proposing to place a limit of 18 dBW EIRP on response station transmitters in cellularized systems. We propose that higher power facilities be separately authorized and require a site specific interference analysis. Given the extremely complex interference situation attendant to cellularized operations and the heavily encumbered nature of MDS and ITFS environments, we do not believe that it would be prudent to permit essentially unlimited numbers of response station transmitters with 2000 watts (33 dBW EIRP) of radiated power, as Petitioners requested. We will not so constrain boosters, which we propose to permit to operate up to the maximum power levels permitted for MDS and ITFS. We note that in some areas, it may be more cost effective to use fewer higher power boosters to overcome propagation hindrances.

43. We solicit comment on these proposals, including Petitioners' interference analysis methodology represented in Appendix D, and any alternative methods by which interference to, and from, cellularized systems could be calculated. We invite specific comment on Petitioners' methodologies for statistically predicting response station locations and the creation of classes and regions for worst-case analyses. We also solicit comment specifically on any means or methods of facilitating the timely review and consideration of cellularized system filings and their associated interference showings. For example, are there less complex solutions or partial solutions for analyzing cellular and/or two-way systems of the nature proposed herein? To what extent could "worst case" analysis serve a sufficient approximation to a more exact analysis, such as a determination of noninterference based solely on terrain shadowing? Under Petitioners' methodology for interference analysis the effects of all cells in the service area are aggregated,

which may be sufficient for relatively small service areas, but to what geographical extent should individual response station areas be aggregated in large BTAs? Petitioners propose that the protected signal level of response station hubs be "the minimum received signal level that the proposed response station hub can actually utilize in the provision of service, specified in dBW/m²/Hz." See proposed Section 21.909(c)(2)(iii), Appendix C. Should such an important element in the interference analysis be permitted to be specified by a system operator without some objective basis which could be validated or, alternatively, could a suitably representative value be determined for this purpose?

44. Finally, in their Reply Comments, Petitioners espouse the idea that licensees of booster stations or response station hubs need not cure all actual interference caused by their operations. Petitioners explain that predictions of interference are based on certain assumptions, such as receive antenna height and gain and discrimination characteristics, and MDS and ITFS licensees have not been entitled to interference protection where their facilities have departed from those characteristics, for instance where the receive antenna is installed at a height greater than 30 feet. Nevertheless, we emphasize that where the receive antenna does meet the characteristics set forth in our Rules, the station causing harmful interference is responsible for curing it. This responsibility is a well-settled principle in our Rules.⁴⁵ We also have declared with respect to MDS stations and ITFS facilities being leased or used for non-ITFS purposes, that if a station causes harmful interference within the protected service area of another existing station and the interference is not *de minimis*, "we will require the offending station to cease operations until the interference is eradicated. The station alleging that it is being interfered with will be required to make a clear and convincing showing that the interference is occurring." ⁴⁶

D. Application Processing Issues

45. Petitioners have proposed a substantial number of changes in the way we would process MDS and ITFS applications. These changes would represent a fundamental shift in the review function of the Commission in this area and call for substantially increased diligence on the part of MDS and ITFS licensees in regard to tracking and monitoring the impact of applications by other parties on their own service. We note here, however, that no changes have been proposed to Sections 74.901, 74.913, 74.931 and 74.932 of our Rules which would modify the basic eligibility requirements or responsibilities of ITFS licensees. Similarly, no changes have been proposed with respect to Section 74.990 of our Rules, pertaining to the use of available ITFS frequencies by wireless cable entities and, therefore, no changes have been proposed to Section 74.990(e), governing the preferences between mutually exclusive ITFS applicants and MDS applicants for vacant ITFS channels, although, as discussed below, we ask whether some changes should be considered. Nonetheless, the changes that are proposed would significantly

⁴⁵ See 47 C.F.R. §§ 21.902(b)(2), 21.938(d), and 21.939.

⁴⁶ *Amendment of Parts 21, 74 and 94 of the Commission's Rules and Regulations with regard to the technical requirements applicable to the Multipoint Distribution Service, the Instructional Fixed Television Service and the Private Operational-Fixed Microwave Service (OFS)*, 98 FCC 2d 68, 93 (1984).

alter the way applications are processed and reviewed. As explained below, we propose to adopt some of Petitioners' proposals, modify some and reject others.

46. Petitioners propose that we adopt a rolling, one-day filing window system to govern the filing of new or modified MDS/ITFS applications for response station hubs or boosters. Such applications when filed on the same day would not be considered mutually exclusive, but rather would all be granted. Under the contemplated system, each applicant will be required to demonstrate protection to facilities existing or proposed prior to the filing of its application. The Petitioners ask that in cases where closely-spaced facilities are proposed on the same day, the filers will be left to resolve any incompatibilities and the Commission's staff will thereby be freed from having to determine and resolve mutual exclusivity. Petitioners' proposal in this area presents a promising start, but still leaves a number of concerns and questions unresolved. Commenter CTN has raised the concern that the one-day rolling filing window will create an undue burden on ITFS licensees, who may find themselves required to evaluate a continuing stream of applications. We solicit comment on how such a concern could be resolved in the context of the one-day rolling filing window. We also solicit comment on whether we should retain our current periodic filing window system used for ITFS applications and what advantages and disadvantages exist between the existing system and the proposed system.

47. In addition to concerns regarding the burden on ITFS licensees, Petitioners' proposal leaves a number of significant questions unresolved regarding the processing of conflicting applications. For example what should be the result in the event that same-day filers of closely-spaced conflicting applicants cannot resolve their differences? Should the applicants be ordered into binding arbitration for which they will assume the cost and whose outcome will be finally subject to Commission approval? If so, what standards and criteria should govern the arbitration? Should the Commission simply freeze the applications until the parties are able to resolve their differences? Should the Commission's staff function as a referee in such cases? Should the staff impose a resolution and, if so, should it adopt any sort of comparative criteria to guide its decisions? Should the staff adopt some type of point system to rate competing applicants? We seek comment on these questions in particular and on Petitioners' proposal regarding the application process in general.

48. We also seek comment on what form the engineering section of a station application under the new rules should take. As discussed in Section C, above, any service proposal under these new rules could have significant interference implications. In connection with the engineering portion of the applications, we seek comment on the reliability of interference agreements entered into by the parties. We also seek comment on whether ITFS licensees are subjected to undue pressure to provide "no objection" letters and, if so, what actions would be useful and effective in reducing the problem.

49. In order to further expedite the processing of response station hub and booster applications and to reduce the burden on Commission resources, Petitioners propose that such applications would be placed on public notice without prior staff review of the accompanying interference studies, and that the applications would be automatically granted on the 61st day after

that notice unless a petition to deny was filed or the Commission notified the applicant prior to that date that a grant would not be made. Petitioners argue that this approach would mean that the only time the staff would be required to review the complex interference studies accompanying a two-way application would be in those situations where the applicant could not secure consent to its proposal, and/or a petition to deny is filed. Although we tentatively accept Petitioners' proposal to place the applications on public notice without prior staff review of the interference studies, we tentatively reject their proposal for an automatic grant of the applications. We believe that placing the applications on public notice without prior interference analysis will serve to speed the review process by making the relevant data available to all interested parties as quickly as possible. However, we believe that an automatic grant at the end of the proposed 60 day public notice period will not provide an adequate opportunity for interested parties or, where necessary, for Commission staff, to review the interference studies or for the Commission to make a reasoned determination in complex cases. We solicit comment on our conclusions.

50. A number of commenters share our concerns that ITFS licensees will not have adequate time or resources to evaluate proposed service plans under the terms of Petitioners' proposal.⁴⁷ These commenters argue that Petitioners' proposal would increase the burden on ITFS licensees to monitor and evaluate ITFS and MDS filings. This would result in a particular burden on these ITFS licensees because of the limited technical, legal and financial resources of educational institutions. These commenters are particularly concerned that they or other educational institutions may find themselves pressured or coerced by neighboring licensees or strong wireless cable operators, in part because those parties would control access to the information needed to adequately evaluate the impact of any particular service proposal. We solicit further comment on this issue and especially solicit comment from small ITFS operators.

51. Relatedly, commenter ComSpec has raised concerns regarding the availability to other affected parties of information concerning agreements between adjoining licensees. ComSpec urges that we require parties to inform us of changes in the technical parameters of their response station hub receiving antenna systems and specify any such changes. Commenter Northeastern urges that a database be maintained containing the actual operating parameters of every MDS and ITFS system so that third parties may be able to determine how new applications might affect existing stations. We solicit comment on these proposals of ComSpec and Northeastern.

52. We tentatively propose the following processing rules, taking into consideration the concerns of the various commenters. Under these rules, applicants would file an original and two copies of their system proposal and serve a copy of the proposal on any party whose MDS/ITFS interests may be affected by the proposal. A complete application would then be placed on public notice for a 60-day initial comment period. Prior to the expiration of the 60-day

⁴⁷ See Comments of CTN, Dallas Community College District, *et al.* ("Dallas"), Northeastern University ("Northeastern"), Pace, ComSpec Corporation ("ComSpec"), Arizona State Board of Regents, *et al.* ("Arizona") and the Archdiocese of Los Angeles ("Archdiocese").

period, interested parties could file comments, petitions to deny or requests for extension of time to file comments or petitions to deny. Although it is our policy that requests for extension of time shall not be granted,⁴⁸ and we do not propose to change that policy, we anticipate that the limited resources available to an ITFS party to review a potentially complex two-way service proposal will be a factor considered in whether we grant a request for extension of time. In the alternative, we would consider adopting a 120-day initial comment period, with requests for extensions of time considered only in extraordinary circumstances. We seek comment on these proposals and solicit detailed alternate proposals. We especially seek comment on what time period parties believe would be necessary to adequately review a service proposal without unduly delaying the processing of such a proposal.

53. Rather than adopt Petitioners' proposed automatic grant, we tentatively conclude that, at the end of any comment period that we may adopt and following any further staff review, the Commission staff, pursuant to delegated authority, would issue a grant or denial of any authorization pursuant to the revised rules. If no oppositions have been filed in a particular proceeding and the Commission staff has determined that a service proposal would not cause interference in violation of our Rules, we anticipate that such a grant would be accomplished quickly. We seek comment on both our proposed approach and on Petitioners' proposed automatic grant.

54. Petitioners speculate that a large number of applications are likely to be filed once the new rules become effective and that many of the applications submitted at that time will conflict with others filed simultaneously. In order to smooth the transition to the rolling one-day filing window application processing system, the Petitioners propose that a special one-week window be employed when the new rules first go into effect, and that all applications filed during this window be deemed filed as of the same day. Following the publication of a public notice announcing the tendering for filing of applications submitted during that window, applicants would have a period of 60 days to amend their applications to resolve conflicts, provided such amendments do not result in any increase in interference to any previously proposed or authorized station (including facilities proposed during the window), absent consent of the applicant for or licensee of the station that would receive such interference. During this 60-day period, no additional applications could be filed, affording those who filed during the one-week window an opportunity to resolve any conflicts without fear that, during the pendency of settlement discussions, third parties will propose facilities that will have to be protected.

55. At the conclusion of that 60-day period, Petitioners propose that the Commission would publish a public notice announcing the acceptance for filing of all applications submitted during the initial window, as amended during the 60-day period. Petitioners propose that all petitions to deny and comments on the applications be filed within 60 days of the second public notice. Under Petitioners' proposal, each application submitted during the initial window would then be automatically granted on the 61st day after the Commission shall have given notice of

⁴⁸ 47 C.F.R. § 1.46.